UNITED STATES DISTRICT COURT
DISTRICT OF DELAWARE

Evonik Degussa GmbH, Plaintiff, v. Materia Inc., *et al.*, Defendants.	Civil Action Nos. 09-cv-636 (NLH/JS) & 10-cv-200 (NLH/JS) CONSOLIDATED **MARKMAN OPINION**
Materia Inc., Counterclaim Plaintiff, *and* University of New Orleans Foundation, Third-Party Plaintiff, v. Evonik Degussa GmbH., Counterclaim and Third-Party Defendant.	

Hillman, District Judge.[1]

Currently pending before the Court is a patent claim construction pursuant to Markman v. Westview Instruments, Inc.,

[1] United States District Court Judge for the District of New Jersey, sitting by designation.

52 F.3d 967, 976 (Fed. Cir. 1995), aff'd 517 U.S. 370 (1996). For the reasons that follow, the disputed claim terms are construed as indicated in this Memorandum Opinion and accompanying Order.

I. BACKGROUND

A. The Patents

At issue in this dispute are three patents: (1) U.S. Patent No. 7,378,528 ("the '528 Patent"); (2) U.S. Patent No. 7,652,145 ("the '145 Patent"); and (3) U.S. Patent No. 7,622,590 ("the '590 Patent"). The disputed terms in these patents are as follows: (1) the meaning of "N-heterocyclic carbene" within the context of the '528 and '145 Patents; (2) claim elements conjoined by the word "and" within the '528 and '145 Patents; (3) the meaning of "neutral electron donor" within the context of the '145 Patent; and (4) construction of "aryl" in the '590 Patent.

The '528 Patent was issued to Wolfgang Anton Herrmann, Wolfgang Schattenmann, and Thomas Weskampp on May 27, 2008, and was subsequently assigned to Plaintiff and Third-Party Defendant Evonik Degussa GmbH (hereinafter "Plaintiff" or "Evonik"). Although there are thirty-one (31) claims within the '528 Patent, Claims 1 and 8 contain the disputed terms at issue. Claim 1 of the '528 Patent states (with disputed terms in bold):

> A complex of ruthenium of the structural formula I, . . . where X^1 and X^2 are identical or different and are each an anionic ligand, R^1 and R^2 are identical or different and are each hydrogen or a hydrocarbon group, where the

> hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms and silyl radicals, or R^1 and R^2 form a ring, where one or more of the hydrogen atoms in the hydrocarbon or silyl groups or both the hydrocarbon and silyl group can be replaced independently by identical or different alkyl, aryl, alkenyl, alkynyl, metallocenyl, halogen, nitro, nitroso, hydroxy, alkoxy, aryloxy, amino, amido, carboxyl, carbonyl, thio or sulfonyl groups, the ligand L^1 is an N-heterocyclic carbene of the formulae II-V and the ligand L^2 is an N-heterocyclic carbene of the formulae III-V or an amine, imine, phosphine, phosphite, stibine, arsine, carbonyl compound, carboxyl compound, nitrile, alcohol, ether, thiol or thioether, . . . where R_1, R_2, R_3 and R_4 in the formulae II, III, IV and V are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups comprise identical or different, cyclic, noncyclic, straight-chain or/and branched radicals selected from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms and aryl radicals having up to 30 carbon atoms, in which at least one hydrogen may be replaced by functional groups, **and** where one or both of R_3 and R_4 may be identical or different and are halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl groups.

('528 Patent, col. 15, lines 2-67; col. 16, lines 1-11.)

The other claim at issue in the '528 Patent — Claim 8 — provides as follows (with disputed terms in bold):

> A complex of ruthenium of the structural formula I, . . . where X^1 and X^2 are identical or different and are each an anionic ligand, R^1 and R^2 are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among other straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms,

> aryl radicals having up to 30 carbon atoms and silyl radicals, or R^1 and R^2 form a ring, where one or more of the hydrogen atoms in the hydrocarbon or silyl groups or both the hydrocarbon and silyl group can be replaced independently by identical or different alkyl, aryl, alkenyl, alkynyl, metallocenyl, halogen, nitro, nitroso, hydroxy, alkoxy, aryloxy, amino, amido, carboxyl, carbonyl, thio or sulfonyl groups or mixtures thereof the **ligand L^1 is an N-heterocyclic carbene** and the ligand L^2 is N-heterocyclic carbene of the formulae III-V or an amine, imine, phosphine, phosphite, stibine, arsine, carbonyl compound, carboxyl compound, nitrile, alcohol, ether, thiol or thioether, and wherein formulae (III)-(V) are . . . where R_1, R_2, R_3 and R_4 in the formulae III, IV and V are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups comprise identical or different, cyclic, noncyclic, straight-chain or/and branched radicals selected from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals havin [*sic*] up to 50 carbon atoms and aryl radicals having up to 30 carbon atoms, in which at least one hydrogen may be replaced by functional groups, **and** where one or both of R_3 and R_4 may be identical or different and are halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl groups.

('528 Patent, col. 17, lines 3-67; col. 18, lines 1-5.)

The '528 Patent is a divisional patent of the '145 Patent, and the two patents share a common specification.[2] The '145 Patent was also issued to Herrmann, Schattenmann, and Weskampp on January 26, 2010, and assigned to Plaintiff Evonik. Patent '145 contains twenty-six (26) claims; but Claims 1 and 11 are the claims at issue in the instant claim construction dispute. Claim

[2] A "divisional patent" means that the two patents are closely related, have a common application, and share the same inventors, but assert different claims.

1 of the ’145 Patent provides in full as follows (with disputed term in bold):

> A complex of ruthenium of the structural formula I, . . . where X^1 and X^2 are identical or different and are each an anionic ligand, R^1 and R^2 are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having from up to 30 carbon atoms and silyl radicals, or R^1 and R^2 form a ring, where one or more of the hydrogen atoms in the hydrocarbon or silyl groups or both the hydrocarbon and silyl group can be replaced independently by identical or different alkyl, aryl, alkenyl, alkynyl, metallocenyl, halogen, nitro, nitroso, hydroxy, alkoxy, aryloxy, amino, amido, carboxyl, carbonyl, thio or sulfonyl groups, the ligand L^1 if an N-heterocyclic carbene of the formula II and the ligand L^2 is an amine, imine, phosphine, phosphite, stibine, arsine, carbonyl compound, carboxyl compound, nitrile, alcohol, ether, thiol, or thioether . . . where R_1, R_2, R_3 and R_4 in formula II are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups comprise identical or different, cyclic, noncyclic, straight-chain or/and branched radicals selected from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms and aryl radicals having up to 30 carbon atoms, in which at least one hydrogen may be replaced by functional groups, **and** where one or both of R_3 and R_4 may be identical or different halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl groups.

(’145 Patent, col. 12, lines 13-67; col. 13, lines 1-13.)

Claim 11 of the ’145 Patent provides as follows (with disputed terms in bold):

> A method for synthesizing the compound as claimed in claim 1, comprising contacting a compound of the formula II . . . with a compound of the formula(I) . . . wherein: X^1 and X^2 are either the same or different and are anionic ligand; R^1 and R^2 are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are identical or different and are selected independently from among straight-chain, branched, cyclic or noncyclic radicals from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms and silyl radicals, or R^1 and R^2 form a ring, L^1 and L^2 are either the same or different and are **neutral electron donors**; where R_1, R_2, R_3 and R_4 in the formula II are identical or different and are each hydrogen or a hydrocarbon group, where the hydrocarbon groups are each selected independently from among straight-chain, branched, cyclic or noncyclic radicals of the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms, aryl radicals having up to 30 carbon atoms, metallocenyl or silyl radicals, in which one or more hydrogens may be replaced by a functional group.

('145 Patent, col. 14, lines 20-67.)

On November 24, 2009, the '590 Patent was issued to Steven P. Nolan and Jinkun Huang, and was assigned to Third-Party Plaintiff The University of New Orleans Foundation ("UNOF"). The '590 Patent has 100 claims, of which Claims 27 and 45 are relevant here.[3] Claim 27 provides the following (with disputed terms in bold):

[3] Defendants actually contend that Evonik infringes upon Claims 27, 45, 46, 59, 84, 94, 97, and 98 of the '590 Patent. However, the parties and the Court only address Claims 27 and 45 as they are the only independent claims in dispute with respect to the '590 Patent.

> A catalytic complex of the formula: . . . wherein M is Os or Ru; in which carbon C is bonded to up to two groups R and R^1; R and R^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, **aryl**, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, aryloxy, C_1-C_{20} alkylthio, C_1-C_{20} alkylsulfonyl, and C_1-C_{20} alkylsulfinyl each R and R^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_{10} alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy, or with a functional group; X and X^1 are independently selected from the group consisting of anionic ligands; L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and L^1 is of the formula . . . wherein Y and Y^1 are each independently an **aryl** group substituted with halogen, C_1-C_5 alkyl, or C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and Z and Z_1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_2-C_{20} alkoxycarbonyl, **aryl**, C_2-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20} alkynyloxy, and aryloxy, each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

('590 Patent, col. 20, lines 30-67; col. 21, lines 1-12.)

Claim 45 of the '590 Patent provides as follows (with disputed terms in bold):

> A catalytic complex of the formula . . . wherein L is selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, ether, amine, amide, sulfoxide, carbonyl, nitrosyl, pyridine and thioether; and L^1 is a nucleophilic carbene, wherein L^1 is of the forumla . . . wherein Y and Y^1 are each independently an **aryl** group substituted with halogen, C_1-C_5 alkyl, or C_1-C_5 alkoxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy; and Z and Z^1 are independently selected from the group consisting of hydrogen, C_1-C_{20} alkyl, C_2-C_{20} alkenyl, C_2-C_{20} alkynyl, C_{21}-C_{20} alkoxycarbonyl, **aryl**, C_1-C_{20} carboxylate, C_1-C_{20} alkoxy, C_2-C_{20} alkenyloxy, C_2-C_{20}

> alkynyloxy, and aryloxy each Z and Z^1 optionally being substituted with C_1-C_5 alkyl, halogen, C_1-C_5 alkooxy, or with a phenyl group substituted with halogen, C_1-C_5 alkyl or C_1-C_5 alkoxy.

('590 Patent, col. 23, lines 1-39.)

B. General Description of the Technology at Issue

In the simplest of terms, the subject matter of the above patents relates to the facilitation of chemical reactions, particularly olefin methathesis catalyst reactions. As jointly submitted by the parties, during a chemical reaction, the bonds in one or more molecules break and new bonds are created, resulting in the formation of new molecules. (See Docket No. 278, Joint Tutorial in Supp. of Parties' Markman Briefs, at 5.) Olefin methathesis is a specific type of chemical reaction. (Id.) An "olefin" is defined as an organic compound containing one or more pairs of carbon atoms linked by a double bond. (Id. at 4.) The carbon-carbon double bonds of olefins undergo many different types of chemical reactions, including a reaction known as "metathesis." (Id. at 5.) During olefin methathesis, a catalyst molecule — typically a metal such as ruthenium ("Ru") — causes the double bonds of two olefins to break. (Id.) The atoms of the two original olefins then rearrange, and new double bonds are formed. (Id.) Notably, in the absence of an appropriate catalyst, the olefins cannot undergo this chemical reaction. (Id.) Accordingly, chemists have engineered and manufactured catalyst compounds that facilitate appropriate

chemical reactions, which in turn serve as the basis of certain pharmaceutical drugs, polymers, and commercially-used industrial compounds.

The instant patents relate to the discovery of catalyst molecules that facilitate olefin metathesis. (Id.) Particularly, the patented catalyst molecules all contain a central atom, ruthenium ("Ru"), that is double bonded to a carbon ("C") atom ("Ru = C"). (Id. at 6.) In addition to the double bond with the carbon atom, other chemical groups called "ligands"[4] are also attached to the ruthenium atom. (Id.) As described above, the ruthenium catalyst causes the double bond of the carbon atom to break, resulting in an olefin methathesis chemical reaction. (Id. at 5.) The chemical reaction facilitated by the use of the particular catalyst at issue has been influential in the areas of pharmaceuticals, petrochemicals, and specialty chemicals. (Id.)

C. Procedural History

Evonik brought the instant patent action against Defendant and Counterclaimant Materia, Inc. ("Materia") on August 26, 2009, alleging that Materia infringed upon the '528 Patent assigned to Evonik. On March 11, 2010, Evonik brought another patent infringement suit against Elevance Renewable Sciences, Inc.

[4] A "ligand" is a molecule that binds a central metal atom, such as ruthenium, to form a group of molecules.

("ERS"), which included allegations that ERS and Materia both infringed upon the '528 Patent and '145 Patent.[5] Based on their common subject matter, these two patent suits were consolidated into one action before this Court on April 8, 2010. Subsequently, in its answer to Evonik's second complaint, Materia joined UNOF as a third-party, and the two filed a counterclaim against Evonik alleging willful infringement of the '590 Patent that had been assigned to UNOF and licensed to Materia.[6]

With respect to the immediate issues at hand, on February 7, 2011, Evonik, Materia, and UNOF all submitted extensive briefing and a voluminous Joint Appendix of related documents on the issue of how certain claims in the patents should be construed. The parties then filed their respective answering briefs on the claims construction issue on March 31, 2011. A one-day Markman Hearing was held on July 20, 2011, at which time the parties offered a tutorial and their interpretation of why the claims in dispute should be construed according to their respective proffered interpretations. Accordingly, the issue of claim construction is now ripe for this Court's review.

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[5] ERS subsequently settled its dispute with Evonik and is no longer a party to the instant lawsuit.

[6] For purposes of clarity and ease of reference, the Court will hereinafter jointly refer to Material and UNOF as "Defendants."

II. JURISDICTION

This Court exercises subject matter jurisdiction pursuant to 28 U.S.C. § 1331 (federal question jurisdiction) and 28 U.S.C. § 1338(a) (federal jurisdiction relating to patents).

III. STANDARD OF LAW

In a patent infringement suit, the initial step is to define the meaning and scope of the claims of the patent. CSB-Sys., Int'l, Inc. v. SAP Am., Inc., No.Civ.A.10-2156, 2011 WL 3240838, at *3 (E.D. Pa. July 28, 2011) (citing Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1995)). Specifically, the court should focus its analysis on the language of the patent's claims, as "it is that language that the patentee chose to use to 'particularly point[] out and distinctly claim[] the subject matter which the patentee regards as his invention." CSB, 2011 WL 3240838 at *3 (citing Interactive Gift Express, Inc. v. Compuserve, Inc., 256 F.3d 1323, 1331 (Fed. Cir. 2001); 35 U.S.C. § 112.) It has previously been recognized that the language utilized in a patent's claims bears a "heavy presumption" that its words have an "ordinary and customary meaning." CSB, 2011 WL 3240838 at *3 (citing Tex. Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1202 (Fed. Cir. 2002)). Moreover, it is important to construe a disputed term within the context of the claim in which it is used, as well as the other claims listed in the patent in question. CSB, 2011 WL 3240838 at

*4 (citing Phillips, 415 F.3d at 1314). Indeed, "'[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.'" CSB, 2011 WL 3240838 at *3 (quoting Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1250 (Fed. Cir. 1998)).

If the construction of a particular term is not readily apparent from a claim's text, the court can look to the same resources that "a person of ordinary skill in the art" would review for guidance. This includes both intrinsic and extrinsic evidence. CSB, 2011 WL 3240838 at *3 (citing Multiform Desicants, Inc. v. Medzam, Ltd., 133 F.3d 1473, 1477 (Fed. Cir. 1998); Dow Chem. Co. v. Sumitomo Chem. Co., Ltd., 257 F.3d 1364, 1373 (Fed. Cir. 2001)). Moreover, courts have also recognized that a person of ordinary skill in the art would not interpret a claim term in isolation, but rather would interpret it within the context of the entire factual record. CSB, 2011 WL 3240838 at *3.

Where there is ambiguity with respect to a term's construction, the most significant source of authority in the record is the intrinsic evidence. Id. (citing Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996); Phillips v. AWH Corp., 415 F.3d 1303, 1316 (Fed. Cir. 2005)). More

specifically, the patent specification[7] has been recognized to be "'the single best guide to the meaning of the disputed term,'" and is "usually dispositive as to the meaning of the words." CSB, 2011 WL 3240838 at *3 (quoting Vitronics, 90 F.3d at 1587; citing Phillips, 415 F.3d at 1316). This is because, "[o]n occasion, 'the specification may reveal a special definition given to a claim term . . . that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs.'" CSB, 2011 WL 3240838 at *3 (quoting Phillips, 415 F.3d at 1316; citing CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed. Cir. 2002)). "The specification may also 'reveal an intentional disclaimer, or disavowal, of claim scope by the inventor . . . [which] is regarded as dispositive.'" CSB, 2011 WL 3240838 at *3 (quoting CCS Fitness, 288 F.3d at 1366; citing SciMed Life Sys., Inc. v. Adv. Cardiovascular Sys., Inc., 242 F.3d 1337, 1343-44 (Fed. Cir. 2001)).

In addition to the patent specification, important consideration should also be afforded to the patent's prosecution history. The prosecution history is comprised of "'the complete

[7] The patent specification is "that part of a patent application which precedes the claim and in which the inventor specifies, describes, and discloses the invention in detail." McCarthy's Desk Encyclopedia of Intellectual Property 408 (2d ed. 1995).

record of proceedings before the Patent Office and includes the prior art cited during examination.'" CSB, 2011 WL 3240838 at *4 (citing Phillips, 415 F.3d at 1317). This is helpful because it provides evidence of how the United States Patent and Trademark Office ("USPTO") and inventor understood the patented technology. Id.

If ambiguity still exists after considering all of the intrinsic evidence, the court may turn then to extrinsic evidence to ascertain the construction of a particular claim term. Extrinsic evidence includes materials such as technical dictionaries, treatises, and expert testimony that provide background on the technology at issue. CSB, 2011 WL 3240838 at *4 (citing Phillips, 415 F.3d at 1318; Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed. Cir. 2002)). "Notably, extrinsic evidence is less significant than the intrinsic record in determining 'the legally operative meaning of claim language." CSB, 2011 WL 3240838 at *4 (citing C.R. Bard, Inc. v. U.S. Surgical Corp., 388 F.3d 858, 862 (Fed. Cir. 2004); Vanderlande Indus. Nederland BV v. Int'l Trade Comm'n, 366 F.3d 1311, 1318 (Fed. Cir. 2004))(internal quotation marks omitted).

In summary, "during claim construction, '[t]he sequence of steps used by the judge in consulting various sources is not important; what matters is for the court to attach the appropriate weight to be assigned to those sources in light of

the statutes and policies that inform patent law.'" CSB, 2011 WL 3240838 at *4 (quoting Teleflex, 299 F.3d at 1325).

IV. CLAIM CONSTRUCTION

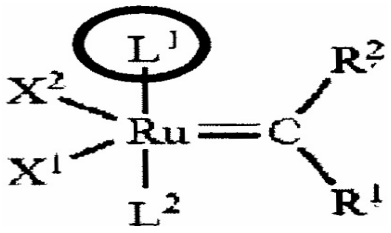
The parties dispute construction of four terms in the aforementioned patents: (1) the meaning of "N-heterocyclic carbene" in the context of the '528 Patent and '145 Patent; (2) claim elements conjoined by the word "and" for certain claims in the '528 Patent and '145 Patent;(3) the meaning of "neutral electron donor" within the context of the '145 Patent; and (4) construction of "aryl" in the '590 Patent. The Court addresses the construction of each term individually below.

A. N-heterocyclic Carbene

The parties dispute the meaning of the term "N-heterocyclic carbene" as it is used in Claim 8 of the '528 Patent,[8] which

[8] The term "N-heterocyclic carbene" is disputed by the parties with respect to both the '528 and '145 Patents. As indicated above, the '528 and '145 Patents are divisional patents that are closely related, have a common application, and share the same inventors and largely the same intrinsic evidence. Given their common background and close relation, the parties subsumed their arguments regarding construction of N-heterocyclic carbene in Claim 1 of the '145 Patent within their arguments regarding construction of this term in the '528 Patent in their submitted briefing and at the Markman Hearing. More specifically, Evonik asserts that the term should be construed consistently in both patents since they share largely the same intrinsic evidence. Defendants, on the other hand, submit that independent construction of the term in the '145 Patent is unnecessary because the claim expressly defines N-heterocyclic carbene by reference to Formula II, which falls within their construction of the term as inclusive of Formulae II-V. Accordingly, given that the parties' jointly argued construction of N-heterocyclic carbene in both the '528 and '145 Patents, the

provides, in relevant part, as follows: "the ligand L^1 is an N-heterocyclic carbene[.]" ('528 Patent, col. 17, lines 29-30.) In order to fully understand the parties' arguments and proffered constructions of this term, reference must be made to five formulae appearing throughout the '528 Patent. The first formula, Formula I, relates to the "object of the invention" of the '528 Patent, which states that: "it is an object of the invention to develop tailored metathesis catalysts which have a high tolerance toward functional groups as a result of a variable ligand sphere and which allow fine adjustment of the catalyst for specific properties of different olefins. This object is achieved according to the invention by a complex of ruthenium of the structural formula I[.]" ('528 Patent, col. 2, lines 27-33.) The chemical composition of Formula I is depicted in the '528 Patent as:



Formula I

At issue here is L^1 of Formula I, as this is the ligand in Claims 1 and 8 of the '528 Patent that has been identified as

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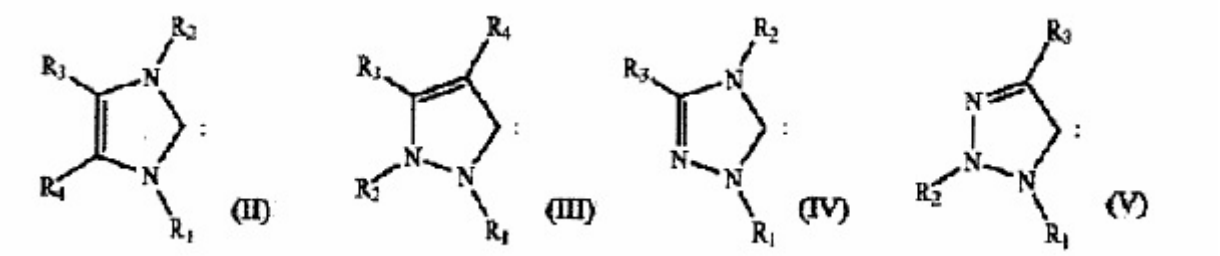
Court's above discussion regarding construction of the term in the '528 Patent applies equally to the '145 Patent.

"N-heterocyclic carbene." Claim 1 of the patent also states that: "the ligand L^1 is an N-heterocyclic carbene of the formulae II-V[.]" ('528 Patent, col. 2, lines 62-63.) Formulae II through V in the '528 Patent have the following chemical structures:



Formulae II-V

These formulae identified in Claim 1 are directly applicable to the parties' proffered constructions of N-heterocyclic carbene because it is disputed whether the scope of N-heterocyclic carbene as used in Claim 8 specifically includes Formulae II-V within its definition.

In its simplest form, Evonik's argument is that the term N-heterocyclic carbene as utilized in Claim 8 of the patent is a broad term that includes more chemical structures than just those depicted in Formulae II-V. Thus, Evonik avers that N-heterocyclic carbene in Claim 8 should be afforded the following construction: "[a] carbene having a molecular structure that comprises at least one ring containing at least

one nitrogen atom in the ring." (Docket No. 181, Evonik Opening Mem. Supp. Contr. Disp. Claim Terms ("Evonik Br.") at 8.) Evonik alleges that its proffered definition is supported by a plain English interpretation, as one of ordinary skill in the art would recognize the disputed term to be comprised of three easily-identifiable parts: (1) "N" meaning the symbol that chemists use to depict nitrogen; (2) "heterocyclic" meaning a ring compound comprised of at least two different elements; and (3) "carbene" meaning a molecule containing a neutral carbon atom attached to two or more unshared electrons. Evonik thus asserts that the Court should adopt a broad scope interpretation for the term in dispute.

On the other hand, Defendants argue that N-heterocyclic carbene in Claim 8 is far more narrow, and should be construed as a specific subset of Formulae II-V, as the patent itself indicates in several sections — most notably, Claim 1 — that "ligand L^1 is an N-heterocyclic carbene of the formulae II-V[.]" According to Defendants, when interpreting the disputed term within the context of the entire record, one of ordinary skill in the art would recognize N-heterocyclic carbene to be defined by reference to Formulae II through V as: (1) a five-membered, (2) aromatic heterocyclic structure,[9] (3) having a

[9] In a chemical structure, an "aromatic" ring is comprised of delocalized electrons that are shared by all member atoms within the ring. (See Docket No. 180, Expert Report of Eric N. Jacobsen ("Jacobsen") ¶ 22.)

carbene carbon atom,[10] and (4) at least two ring nitrogen atoms, (5) where at least one ring nitrogen atom is adjacent to the carbene carbon atom. (Docket No. 178, Claim Constr. Opening Br. ("Defendants' Br.") at 12.) In other words, Defendants assert that the '528 Patent specifically and exclusively "depict[s] and describe[s] four chemical structures ([F]ormulae II, III, IV, and V) as being [N-heterocyclic] ligands." (Id. at 5.)

In response, Plaintiff Evonik avers that Defendants' proposed construction is necessary for them to avoid being found liable for infringement at further points of the litigation. Defendants, on the other hand, allege that Plaintiff's proffered definition is boundless, and covets technology that is beyond the scope of the patent itself.

1. Intrinsic Evidence

A court's analysis in a claim construction dispute should always begin with the precise language of the disputed claims themselves. See Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed. Cir. 2001)(internal citations omitted); Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir.

[10] A carbene carbon atom is a carbon atom that is attached through single bonds to two other atoms and bears a two electron lone pair. In an N-heterocyclic ligand, the carbene carbon atom bonds to and interacts with the ruthenium atom. As depicted in Formulae II-V, the carbene carbon atom appears at the vertex of the five-membered ring and is depicted as two dots ":". (See Jacobsen ¶ 21.)

2005)(internal citations omitted). Here, Claim 8 states that "the ligand L^1 is an N-heterocyclic carbene," and makes no direct reference to Formulae II-IV. Since the scope of the disputed term is not readily apparent from the language of Claim 8 itself, the Court first considers the patent's intrinsic evidence to assist it in construction of this term.

a. The Patent Specification

The United States Code defines a patent's specification as follows:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention. [] The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention. [] A claim may be written in independent or, if the nature of the case admits, in dependent or multiple dependent form.

35 U.S.C. § 112(a-c). As noted above, the patent specification is recognized to be "'the single best guide to the meaning of the disputed term,'" and is "usually dispositive as to the meaning of the words" because "[o]n occasion, 'the specification may reveal a special definition given to a claim term . . . that differs from the meaning it would otherwise possess." CSB-Sys., Int'l, Inc. v. SAP Am.,

Inc., No.Civ.A.10-2156, 2011 WL 3240838, at *3 (E.D. Pa. July 28, 2011)(internal quotations & citations omitted).

Defendants point the Court to two specific sections of the '528 Patent specification to support their proffered constructions of N-heterocyclic carbene: (1) the "Object of the Invention," and (2) the "Examples" sections.

The Object of the Invention section indicates that the patented technology was created for the purpose of "tailor[ing] metathesis catalysts which have a high tolerance toward functional groups as a result of a variable ligand sphere and which allow fine adjustment of the catalyst for specific properties of different olefins." ('528 Patent, col. 2, lines 27-31.) In other words, as proffered by Defendants, "the object of the invention was to replace the phosphine ligands with something that allowed more customization to particular [chemical] reactions." (Defs.' Br. at 13.) The Object of the Invention section of the patent specification then proceeds to state that: "[t]his object is achieved according to the invention by a complex of ruthenium of the structural formula I . . . [where] ligand L^1 is an N-heterocyclic carbene of the formulae II-V[.]" ('528 Patent, col. 2, lines 33-35, 62-63.) Thus, according to Defendants, Evonik's direct reference to Formulae II-V in this section of the patent indicates that these formulae are features of the

invention itself, and therefore are implicitly included within the definition of N-heterocyclic carbene in Claim 8.

In a similar vein, Defendants also point out that all nine examples provided in the Examples section of the '528 Patent describe a chemical complex containing an L^1 ligand having the same chemical structure as that depicted in Formulae II. Thus, Defendants maintain that "the examples provided in the 'Examples' section would not have taught one of ordinary skill in the art to use any other [N-heterocyclic] ligands beyond the chemical structures of [F]ormula II." (Defs.' Br. at 15.)

However, Defendants' reliance on these sections of the patent to show that the patentee meant to include Formulae II-V in its definition of N-heterocyclic carbene in Claim 8 is unconvincing for several reasons. First, the Federal Circuit Court of Appeals has repeatedly recognized that limitations and examples provided in a patent's specification should not be read to limit the claims of the patent. See Comark Commc'ns, Inc. v. Harris Corp., 156 F.3d 1182, 1186-87 (Fed. Cir. 1998); E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co., 849 F.2d 1430, 1433 (Fed. Cir. 1988); Sjolund v. Musland, 847 F.2d 1573, 1581 (Fed. Cir. 1988); Texas Instruments, Inc. v. U.S. Int'l Trade Comm'n, 805 F.2d 1558, 1563 (Fed. Cir. 1986)("This court has cautioned against

limiting the claimed invention to preferred embodiments or specific examples [provided] in the specification."). Thus, merely because reference is made to one or more of Formulae II-V in conjunction with the disputed term in certain sections of the specification does not automatically mean that these references can be read to limit the scope of N-heterocyclic carbene in Claim 8 to only Formulae II-V.

Furthermore, while Defendants' argument based on the repeated references in the Examples to the Formula II molecular structure could support a finding that the definition of N-heterocyclic carbene is inclusive of Formula II, it does not likewise support a finding that the term always includes Formulae III-V. Indeed, the patentee's use of only one of the chemical structures as an example, but reference to other formulae within the specification, is indicative of the fact that the patentee did not intend to specifically limit the scope of the patent to any particular formula, but rather identified some molecular structures as preferred embodiments. Federal courts have repeatedly recognized that "'[e]ven when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated clear intention to limit the claim scope using 'words or expressions of manifest exclusion or restriction.'" Rembrandt Vision

Techs., L.P. v. Johnson & Johnson Vision Care, Inc., No.Civ.A.09-200, 2011 WL 1627096, at *5 (E.D. Tex. Apr. 28, 2011)(quoting Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 906 (Fed. Cir. 2004))(further citation omitted). Here, the patentee has not demonstrated such a clear intention to limit Claim 8.

Moreover, although the Object of the Invention and Examples sections utilize N-heterocyclic carbene by reference to Formulae II-V, other sections of the patent specification utilize the term without referencing these formulae. For example, one of the very first introductory phrases of the specification provides that, "[t]he invention relates to alkylidene complexes of ruthenium containing N-heterocyclic carbene ligands[.]" ('528 Patent, col. 1, lines 19-20.) Other sections of the patent specification likewise specifically omit reference to Formulae II-V when referencing N-heterocyclic carbene: "[v]ariation of the preparatively readily obtainable N-heterocyclic carbene ligands enables activity and selectivity to be controlled in a targeted manner," and "[i]n the case of a single replacement, the second phosphine can be replaced selectively by another electron donor, *e.g.* . . . N-heterocyclic carbene[.]" (Id.,

col. 3, lines 64-67; col. 4, lines 60-64.)[11] This non-uniform use of N-heterocyclic carbene throughout the patent's specification creates a reasonable doubt that the patentee specifically intended the term's scope to be limited to the molecular structures of Formulae II-V, and further cautions against so limiting the term in this manner.

Moreover, it is a general rule in claim construction disputes that courts should not construe a term in one claim in a manner that would render its use in another claim redundant or superfluous. See Perkinelmer, 537 F.Supp.2d at 404. This rule is known as "the claim differentiation doctrine," and "is based on the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope." Id. (citing Andersen Corp. v. Fiber Composites, LLC, 474 F.3d 1361, 1369 (Fed. Cir. 2007)); see also Phillips v. AWH Corp., 415 F.3d 1303, 1314-15 (Fed. Cir. 2005) ("Differences among claims can also be a useful guide in

[11] Although Plaintiff also points to the use of N-heterocyclic carbene without reference to Formulae II-V in the Title and Abstract sections of the '528 Patent, it has previously been recognized that "patent titles are 'near[ly] irrelevan[t to] claim construction," United Techs. Corp. v. Perkinelmer, Inc., 537 F.Supp.2d 392, 403 n.7 (D. Conn. 2008)(quoting Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1312 (Fed. Cir. 1999)), and that "abstract[s] do[] not form a part of the specification." Perkinelmer, 537 F.Supp.2d at 403 (internal citations omitted).

understanding the meaning of particular claim terms."). Indeed, the claim differentiation doctrine operates to create a presumption of differing scope for differing words. Id.; see also D.M.I., Inc. v. Deere & Co., 755 F.2d 1570, 1574 (Fed. Cir. 1985). The presumption, however, is rebuttable and "can be overcome by strong contrary evidence such as definitional language in the patent or a clear disavowal of claim scope[.]" InterDigital Commc'ns, LLC v. Intn'l Trade Com'n, 690 F.3d 1318, 1324 (Fed. Cir. 2012).

Here, Claim 1 of the '528 Patent expressly provides that "[a] complex of ruthenium of the structural formula I, where . . . the ligand L^1 is an N-heterocyclic carbene of the formulae II-V," ('528 Patent, col. 15, lines 2, 28-30), while Claim 8 explicitly states that "[a] complex of ruthenium of the structural formula I, where . . . the ligand L^1 is an N-heterocyclic carbene[.]" (Id., col. 17, lines 4, 29-31.) Both Claim 1 and Claim 8 are independent claims. According to Plaintiff Evonik, the claim differentiation doctrine applies to the instant circumstances because, if the Court were to adopt Defendants' proffered construction, Claims 1 and 8 would essentially be duplicative and redundant of one another. Defendants, on the other hand, assert that the Evonik has "manufactured" a claim differentiation doctrine scenario, and that the presumption — even if applicable — is overcome by the

fact that Claim 8 was added after proceedings in the underlying interferences took place that lead to the creation of the '528 Patent.

In support of their argument, Defendants rely on the Federal Circuit's decision in ICU Medical, Inc. v. Alaris Medical Systems, Inc., 558 F.3d 1368 (Fed. Cir. 2009). The patents at issue in ICU involved medical valves that received fluid from medical implements without the use of an external needle to transmit fluids to and from a patient. Id. at 1372. Plaintiff ICU alleged that Defendant Alaris infringed upon its "spikeless" claims that claimed technology allowing for the transmission of fluids sans an external needle. Id. Alaris interpreted the term "spike" narrowly to mean "an elongated structure having a pointed tip for piercing the seal, which tip may be sharp or slightly rounded." Id. at 1374. ICU, on the other hand, construed the term broadly to mean "an upward projection." Id. In support of its proposed definition, ICU alleged that, if the court were to adopt Alaris's narrower construction, language found in another claim in the patent that specified that "said end of spike is pointed" would be rendered superfluous and unnecessary. Id. at 1376. The court disagreed with ICU, noting, *inter alia*, that the other claim was added years after the filing date of the original patents and the introduction of the already infringing Alaris

technology. Id. Thus, the court adopted Alaris' narrower construction of the disputed term.[12]

In contrast, in American Medical Systems v. Biolitec, the Federal Circuit relied on the claim differentiation doctrine to adopt a broad definition of the disputed term. 618 F.3d 1354 (Fed. Cir. 2010). The patent in question in Biolitec involved technology that utilized high-intensity laser radiation to treat enlarged prostate glands and resulting urination difficulties. Id. at 1356. Certain claims in the patent specifically limited the ranges of wavelengths of laser beams to precise units, while others did not. Id. at 1357. Relying on the claim differentiation doctrine, the Federal Circuit found that the asserted method claims were not limited

[12] The Court notes that, although it is true that the claims in ICU were added after the filing date of the original patents, this was only one of several factors that the court considered in ultimately rendering its decision. Indeed, in construing the disputed term, the ICU Court noted that the Plaintiff offered no intrinsic or extrinsic evidence in support of its assertion that the ordinary meaning of "spike" would include a non-pointed structure. 558 F.3d at 1376. Here, in comparison, Plaintiff Evonik has cited to several pieces of intrinsic and extrinsic evidence to support its proffered claim construction. Moreover, the court in ICU recognized that the specification "repeatedly and uniformly" referenced the spike as a "pointed instrument" for the purpose of piercing a seal inside the valve. As expressed above, such a clear definition and limiting language is not evident here. Furthermore, the defendant's proffered construction in ICU was incredibly broad — "an upward projection" — while Plaintiff's proffered construction here is considerably more refined and limited: "a carbene having a molecular structure that comprises at least one ring containing at least one nitrogen atom in the ring." Therefore, in addition to the reasoning stated above, the Court further finds ICU distinguishable from the instant case on these grounds.

to specific wavelengths having a prescribed degree of differential absorption. Id. at 1360.

Similarly, in Fujitsu Ltd. v. Tellabs Operations, Inc., the patent in question dealt with communication systems that used optical fibers to amplify the transmission of information through signal light beams. 821 F.Supp.2d 1009, 1041 (N.D. Ill. 2011). The parties disputed construction of the term "optical coupler." Id. at 1045. Fujitsu construed the term broadly to mean "a device that combines or splits signals," while Tellabs interpreted it more narrowly by referencing specific language found throughout the patent's claims which provided that: "a dichroic coupler that passes the first wavelength and reflects the second wavelength." Id. The court adopted Fujitsu's construction, finding that a broader interpretation was more in line with the term's ordinary and customary meaning, and that the text of the patent did not demonstrate a clear intention "to limit the claim's scope with words or expressions of manifest exclusion of restriction." Id. at 1046-47. Thus, despite the fact that the patent's claims themselves included language referencing the first and second wavelengths, the Fujitsu Court nonetheless declined to narrow the scope of the disputed term. Id. The court also distinguished ICU on the grounds that the Federal Circuit's adoption of a narrower construction in that case did not limit

the claim term beyond its ordinary meaning as it did in Fujitsu. Id. at 1047.

Moreover, in In re Scroggie, the applicants appealed a decision of the USPTO that construed the term "personal computer" to mean "a computer built around a microprocessor for use by an individual." 442 F. App'x 547, 548 (Fed. Cir. 2011). On appeal, the applicants relied on certain language found in other claims of the patent and parts of the specification to support their argument that the term "personal computer" was narrow and required access to the Internet and the ability to receive e-mails. Id. at 550. In rejecting this proffered construction, the Federal Circuit looked to other claims which included the Internet and e-mail language as evidence that the representative claim was broader in scope, and that a contrary construction would render the other claims duplicative. Id.[13]

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[13] After the Markman Hearing was conducted in this matter, Defendants submitted a letter to the Court and attached a recent case from the Federal Circuit, American Calcar, Inc. v. American Honda Motor Co., Inc., Nos.Civ.A.09-1503 & 09-1567, 2011 WL 2519503 (Fed. Cir. 2011), that they believe supports their proffered construction of the term in dispute. [Docket Nos. 304, 305.]

American Calcar dealt with technology that notified drivers of faulty conditions in their vehicles. Id. at *1. More specifically, the patented system sent a "C-mail" message to an electronic address associated with the vehicle notifying the owner of the condition. Id. Claim 1 of the patent at issue provided that: "[a] method for facilitating maintenance of vehicles, comprising: electronically sending, to vehicles, messages about a faulty condition of the vehicles, the messages including the identifiers of the vehicle[.]" Id. Claim 2 of the

patent, which was dependent on claim 1, provided that "the messages comprise addresses containing the respective identifiers of the vehicles to which the messages are electronically sent." Id. at *2. The parties disputed construction of the term "messages" in the claims. The plaintiff, ACI, argued that the term should be construed broadly to mean "communications" because the remainder of the claims defined what needed to be included in the messages. Id. at *12. On the other hand, the defendant, Honda, construed "messages" to require a domain address similar to an e-mail address identifier. Id. The district court agreed with Honda, and the Circuit Court affirmed, on the basis that the plain language of claim 1 indicated that the messages needed to include an identifier of the vehicle, and that the patent specification supported a finding that "[l]ike a conventional E-mail message, a C-mail message is formatted in accordance with . . . an address identifying the vehicle itself." Id. Thus, the court found that, "[g]iven the manner in which the specification emphasizes the similarity of a [C-mail] message to a typical E-mail message, it is essential that a car-mail message have an address that includes an identifier unique to the vehicle." Id. (internal citations omitted). Moreover, the court likewise rejected ACI's argument that claim 2 would be superfluous to claim 1 if the court were to accept Honda's construction because the clear language in the claims overrode the application of the claim differentiation doctrine. Id. at *13.

Defendants assert that American Calcar is directly applicable to the instant case and supports their proffered construction of limiting N-heterocyclic carbene to Formulae II-V. American Calcar, however, is distinguishable. First, as indicated above, a court's analysis in a claim construction dispute should always begin with the precise language utilized in the claims themselves. See Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed. Cir. 2001)(internal citations omitted); Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005)(internal citations omitted). If the language of the claims is clearly indicative of how a term should be construed, then it is unnecessary to consider other intrinsic and extrinsic evidence. In American Calcar, the language utilized in the claims themselves clearly indicated that the term "messages" was narrower than "communications" and required some sort of identifier: "messages including the identifiers of the vehicle." Id. at *1. Indeed, at the district court level, the court noted that "it is unclear what other kinds of messages could be 'electronically sent' to vehicles, as required by the plain language of the [c]laim." Am. Calcar, Inc. v. Am. Honda Motor Co. Inc., No.Civ.A.06-2433, 2007 WL 5734827 (S.D. Cal. Sept. 24, 2007).

Upon consideration of the above case law, this Court finds that Claim 8 would essentially be superfluous to and redundant of Claim 1 if it were to adopt Defendants' proffered construction of N-heterocyclic carbene as limited to the molecular structures of Formulae II-V. Stated differently, since the patentee defined N-heterocyclic carbene as limited to Formulae II-V in Claim 1, there would be no need to repeat this definition in Claim 8. Equally importantly, the record here does not present strong contrary evidence that would overcome the claim differentiation doctrine's presumption in favor of differentiating between claims in a patent. Indeed,

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Here, by contrast, the language utilized in Claim 8 does not clearly indicate that N-heterocyclic carbene warrants a narrower construction. To the contrary, the use of N-heterocyclic carbene in Claim 8 actually supports a broader construction, as it merely provides that: "the ligand L^1 is an N-heterocyclic carbene[.]" ('528 Patent, col. 17, lines 29-30.) Moreover, in American Calcar, claim 2 was dependent upon claim 1. 2011 WL 2519503 at *2, 3. Thus, claim 2 expounded on how the messages were to utilize identifiers, and served as a logical progression of claim 1. This is not the case here. Claims 1 and 8 are independent claims, and therefore do not logically flow from one another and are not directly correlated. Finally, the American Calcar Court rejected ACI's claim differentiation doctrine argument on the basis that the clear language in the patent's specification trumped the doctrine, and that the presumption was therefore rebutted. Id. at *13. As noted above, the language in the specification, of the '528 Patent does not so clearly indicate that the disputed term should be afforded a narrow construction. As such, application of the claim differentiation doctrine is not trumped by the clear language of the claim at issue under these circumstances, and the presumption in favor of claim differentiation is not rebutted.

Accordingly, although the Court appreciates counsel bringing this case to its attention, it finds American Calcar to be distinguishable from the matter at hand.

there is no clear definition of "N-heterocyclic carbene" provided in the patent, nor is there evidence of a clear disavowal of the term's scope so as to limit it to Formulae II-V. Thus, application of the claim differentiation doctrine to the instant circumstances counsels against narrowing construction of N-heterocyclic carbene to the structures provided in Formulae II-V.

Accordingly, based on the above, the Court finds that the intrinsic evidence in the patent's specification weighs in favor of a broader construction of the term in dispute.

b. The Prosecution History

The Court next considers the prosecution history of the patent at issue. The '528 Patent arose from a series of interferences before the USPTO that took place between 1998 and 2007.[14] Plaintiff contends that the record of the underlying prosecution history indicates that Evonik intended N-heterocyclic carbene to be afforded a broad scope. More specifically, Evonik avers that statements made in the underlying patent applications disclose the broad suitability of N-heterocyclic carbene. Defendants, on the other hand, maintain that Evonik and its predecessor continuously utilized N-heterocyclic carbene by referencing Formulae II-V throughout

[14] An "interference" is declared by the USPTO when multiple parties try to obtain patents on overlapping subject matter.

the underlying interference proceedings, and that the patent's prosecution history therefore supports a finding that the disputed term should be limited to the formulae.

To support its proffered construction, Plaintiff points to certain documents utilized by the parties in a 2005 interference proceeding. (Docket Nos. 170-75, Joint Appendix re: Claim Constr. ("JA") 2407.) During the proceeding, the Board of Patent Appeals and Interferences had requested the parties to detail the nature of their inventions in order to assist in the resolution of the interference. (Id.) In responding to that request, Evonik indicated that, "as taught in the Herrmann applications,[15] [N-heterocyclic carbene] ligands have increased activity and selectivity. While the Herrmann application claims are limited to specific [N-heterocyclic carbenes], the Herrmann application broadly discloses the suitability of any [N-heterocyclic carbene]." (Id. (internal footnotes omitted).)

As further support, Evonik also cites to the original application filed for the '528 Patent as indicative of the intended broad scope of N-heterocyclic carbene. In the Title and Abstract sections of the original application, the ligand L^1 was defined as an N-heterocyclic carbene without reference

[15] As indicated above, Herrmann was the inventor of the technology that was subsequently assigned to Evonik and that is presently at issue with respect to the '528 Patent.

to Formulae II-V.[16] (JA 728.) The Description section of the application also made no reference to Formulae II-V in addressing N-heterocyclic carbene: "The invention relates to alkylidene complexes of ruthenium containing N-heterocyclic carbene ligands and a process for preparing olefins by olefin methathesis from acyclic olefins having two or more carbon atoms or/and from cyclic olefins having four or more carbon atoms using at least one of these alkylidene complexes as a catalyst." (JA 729.) However, in the Object of the Invention section, N-heterocyclic carbene was identified in conjunction with Formulae II-V:

> [I]t is an object of the invention to develop tailored metathesis catalysts which have a high tolerance toward functional groups as a result of a variable ligand sphere and which allow fine adjustment of the catalyst for specific properties of different olefins. This object is achieved according to the invention by a complex of ruthenium of the structural formula I, where . . . the ligand L^1 is an N-heterocyclic carbene of the formulae II-V.

(JA 732-33 (emphasis added).)

On July 26, 2007, Evonik sought to amend the original patent application. (JA 778-88.) Among the amendments was a

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[16] The Court notes, as it did above in Footnote 11, that language in patent titles and abstracts are typically considered not to be dispositive in claim construction disputes. However, as more fully explained in the body of this Memorandum Opinion, the patentee made direct reference to the Title and Abstract in a subsequent amendment to the application in order to explain the reasoning for the amendment, and the Court therefore affords more weight to the Title and Abstract than it would under typical circumstances.

newly-added claim — Claim 19 — which served as the precursor to the present Claim 8 in the '528 Patent that is in dispute. Claim 19 expressly stated that: "A complex of ruthenium of the structural formula I [] where . . . the ligand L^1 is an N-heterocyclic carbene." (JA 782-83.) The "Remarks" accompanying the amendments indicated that "[s]upport for newly added claim 19 can be found in the original claim 1 and support for the definition of L^1 being an N-heterocyclic carbene can be found in the abstract, the title and page 1, lines 7-13 of the specification." (JA 789.) The "original claim 1" identified N-heterocyclic carbene by reference to Formulae II-V. (JA 754.) However, the Remarks made clear that newly-added Claim 19 was "independent" and therefore not correlated to the other claims in the patent application. (See JA 789 ("The application contains two independent claims 1 and 19.").) Moreover, the Title and lines 7-13 of the specification in the original patent application only identified ligand L^1 as an N-heterocyclic carbene without reference to the Formulae. (JA 728-29.) The Remarks accompanying the amendments also provided that the applicant (Evonik's predecessor) agreed to execute a terminal disclaimer over certain patent applications that served as the predecessors and divisional applications of the '528 Patent in order to expedite the prosecution. The Remarks indicated that

the prior patent applications claimed "patentabl[y] distinct group[s]," and that "formula[e] II and IV are patentably distinct inventions in the declaration of the interference." (JA 789.) The Remarks went on to state that, in comparison to the earlier patent applications, the newly-amended '528 Patent application "claim[s] a broad genus." (Id.)

The parties dispute the relevance of the above evidence from the prosecution history. On its part, Plaintiff asserts that this evidence clearly depicts the broad scope Evonik intended for N-heterocyclic carbene. By contrast, Defendants aver that Plaintiff cherry-picked favorable phrases from the prosecution history to support its argument, and that other portions of the extensive prosecution history repeatedly refer to N-heterocyclic carbene as being limited to Formulae II-V. (See e.g., JA 731-34, 756-57, 789, 1637, 1648, 1659, 1711, 1733-34, 1756, 1762.)

The reason courts look to the prosecution history is for the purpose of ascertaining "how the inventor and the [US]PTO understood the patent." Rembrandt Vision Techs., L.P. v. Johnson & Johnson Vision Care, Inc., No.Civ.A.09-200, 2011 WL 1627096, at *3 (E.D. Tex. Apr. 28, 2011)(citing Phillips v. AWH Corp., 415 F.3d 1303, 1316 (Fed. Cir. 2005)(*en banc*)). The Federal Circuit has previously recognized that, in order to limit the scope of a claim based on statements found in the

prosecution history, the statement "must be clear and unambiguous and constitute a clear disavowal of the scope." Rembrandt, 2011 WL 1627096 at *3 (citing Verizon Servs. Corp. v. Vonage Holdings Corp., 503 F.3d 1295, 1306 (Fed. Cir. 2007)). Such an unambiguous and clear disavowal of the scope of N-heterocyclic carbene is not evident from the record here. To the contrary, the parties' on-again/off-again use of the formulae when identifying N-heterocyclic carbene throughout the voluminous record of the underlying interference proceedings supports a finding that the patentee did not expressly intend to limit the scope of this term. Accordingly, the Court finds that the evidence found in the prosecution history further indicates that the patentee did not intend to limit N-heterocyclic carbene to Formulae II-V.

2. Extrinsic Evidence

Extrinsic evidence includes materials such as technical dictionaries, treatises, and expert testimony that provide background on the technology at issue. CSB-Sys., Int'l, Inc. v. SAP Am., Inc., No.Civ.A.10-2156, 2011 WL 3240838, at *4 (E.D. Pa. July 28, 2011)(citing Phillips, 415 F.3d at 1318; Teleflex, Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed. Cir. 2002)). However, as noted above, the extrinsic evidence is typically considered to be "less significant than the intrinsic record in determining the legally operative

meaning of claim language." CSB, 2011 WL 3240838 at *4 (citing C.R. Bard, Inc. v. U.S. Surgical Corp., 388 F.3d 858, 862 (Fed. Cir. 2004); Vanderlande Indus. Nederland BV v. Int'l Trade Comm'n, 366 F.3d 1311, 1318 (Fed. Cir. 2004))(internal quotation marks omitted). This is because "[t]he patent system is based on the proposition that claims cover only the invented subject matter. . . . Properly viewed, the 'ordinary meaning' of a claim term is its meaning to the ordinary artisan after reading the entire patent. [] [H]eavy reliance on the [extrinsic evidence] divorced from the intrinsic evidence risks transforming the meaning of the claim term to the artisan into the meaning of the term in the abstract, out of its particular context, which is the specification." Martin Marietta Materials, Inc. v. Bedford Reinforced Plastics, Inc., No.Civ.A.03-57J, 2005 WL 6309276, at *11 (W.D. Pa. Aug. 3, 2005)(citing Merrill v. Yeomans, 94 U.S. 568, 573-74 (1876)). Moreover, with respect to expert testimony, our sister district courts have previously recognized that, although experts can be very helpful for providing background on the technology at issue, explaining how an invention works, or to establish that a particular term has a particular meaning in the pertinent field, such testimony "may only be relied upon if the patent documents, taken as a whole, are insufficient to enable the court to construe disputed claim

terms . . . [and can]not be used to vary, contradict, expand, or limit the claim language from how it is defined in the specification or file history." Martin, 2005 WL 6309276 at *17 (internal citations & quotations omitted).

In addition to the intrinsic record, both parties in the instant dispute also rely on certain extrinsic evidence to support their proffered interpretations of N-heterocyclic carbene. More specifically, Evonik cites to a scientific review article written by the inventor of the '528 Patent, Professor Wolfgang Herrmann, to show that the patent's own inventor previously utilized N-heterocyclic carbene broadly and did not limit it to the N-heterocycles prescribed by Formulae II-V.[17] (Evonik's Bench Book for Claim Constr. Hr'g, Tab 7 ("Herrmann Article").)

Herrman's 1999 scientific review article — aptly titled "*N-heterocyclic Carbenes*" — was written in 1999 prior to the filing of the '528 Patent. Notably, throughout the article,

[17] The parties have also provided the Court with expert testimony to support their proffered claim constructions. Both Plaintiff and Defendants have also tried to parse the testimony of the opposing party's experts to undermine the value and merit of their opinions. Although this expert testimony is beneficial to the Court to assist in its understanding of the patented technology and underlying interference proceedings, it is not evidence that more clearly depicts the patentee's intentions when drafting the patent. Accordingly, although appreciated to the extent it helps the Court understand the rudimentary aspects of this matter, the Court does not find the parties' provided expert testimony to be dispositive in construing the claims.

Herrmann did not specifically limit N-heterocyclic carbene to the molecular structures of Formulae II-V, but rather embraced and utilized the term more broadly. Indeed, he explicitly recognized the broad scope of N-heterocyclic carbenes in the article, noting that: "N-heterocyclic carbene complexes exhibit promising properties for a number of catalytic reactions in organic chemistry" and "mak[e] a plethora of substituted, functionalized, chiral, or immobilized derivatives important in catalytic applications accessible." (Id. at 2183, 2185.) Moreover, he did not limit N-heterocyclic carbenes to the molecular structures of Formulae II-V in the section of the article discussing olefin metathesis, and included figures throughout the article that depicted molecular structures beyond those provided in Formulae II-V when discussing N-heterocyclic carbenes. (Id. at 2183.)

Defendants admit that Herrmann utilized a broader interpretation of N-heterocyclic carbene throughout his article, but argue that this is irrelevant because he never actually patented the molecular structures cited in his article that were broader than Formulae II-V. The Court, however, finds that Herrmann's article written prior to the filing of his patent is indicative of the fact that he understood and envisioned N-heterocyclic carbenes to include

more molecular structures than just those of Formulae II-V when he drafted the patent. Thus, since Herrmann construed N-heterocyclic carbene more broadly, it is likewise plausible that his omission of reference to Formulae II-V when discussing N-heterocyclic carbenes in the '528 Patent indicates that he did not intend to limit the term solely to these formulae. Therefore, this piece of extrinsic evidence shows that, at the time of its filing, the inventor of the technology at issue in the '528 Patent construed N-heterocyclic carbene beyond the molecular structures of Formulae II-V.

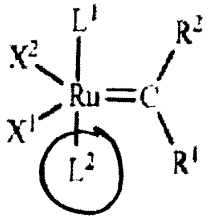
Therefore, given the foregoing discussion, the Court adopts Plaintiff Evonik's proposed construction of N-heterocyclic carbene. Accordingly, the Court construes the term "N-heterocyclic carbene" to mean: "a carbene having a molecular structure that comprises at least one ring containing at least one nitrogen atom in the ring."

B. "And"

The parties likewise dispute interpretation of the word "and" as it is utilized in Claims 1 and 8 of the '528 Patent, and Claim 1 of the '145 Patent. Because the claims in the two patents utilize essentially the same language and were jointly addressed by the parties in their briefing and at the Markman Hearing, the Court considers the term "and" in depth with

respect to Claim 1 of the '528 Patent, with the understanding that the same analysis and ruling applies to Claim 8 of the '528 Patent and Claim 1 of the '145 Patent.

Claim 1 of the '528 Patent begins with the structure of Formula I:



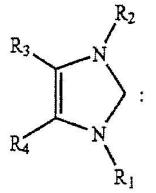
Formula I

At issue here is ligand L^2 of Formula I. Claim 1 defines ligand L^2 as (with disputed term in bold):

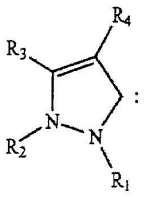
> [T]he ligand L^2 is an N-heterocyclic carbene of the formulae III-V or an amine, imine, phosphine, phosphite, stibene, arsine, carbonyl compound, carboxyl compound, nitrile, alcohol, ether, thiol or thioether,[18]

[18] Unlike Claim 1 which depicts molecular structures for Formulae II-V, Claim 8 of the '528 Patent only identifies Formulae III-V. Claim 8 also includes the phrase "and wherein formulae (III)-(V) are." Claim 1 of the '145 Patent omits the phrase "N-heterocyclic carbene of the formulae III-V" and only includes a molecular structure depicting Formulae II.

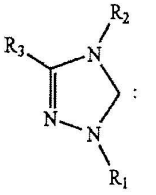
II



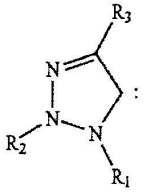
III



IV



V



where R_1, R_2, R_3, and R_4 in the formulae II, III, IV and V[19] are identical or different and are each hydrogen or a hydrocarbon group,

where the hydrocarbon groups comprise identical or different, cyclic, noncyclic, straight-chain or/and branched radicals selected from the group consisting of alkyl radicals having from 1 to 50 carbon atoms, alkenyl radicals having up to 50 carbon atoms, alkynyl radicals having up to 50 carbon atoms and aryl radicals having up to 50 carbon atoms, in which at least one hydrogen may be replaced by functional groups,

and where one or both of R_3 and R_4 may be identical or

[19] Akin to Footnote 18 above, Claim 8 only lists "formulae III, IV, and V." Claim 1 in the '145 Patent only identifies "formulae II."

different and are[20] halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl groups.

('528 Patent, col. 15, lines 29-67; col. 16, lines 1-11.)

The parties dispute the manner in which the bolded term "and" joins the two underlined phrases. Evonik asserts that, like R_1 and R_2, R_3 and R_4 may be identical or different from one another and can each be a hydrogen or hydrocarbon (with the necessary refinements for hydrocarbons depicted in italics). However, unlike R_1 and R_2, R_3 and R_4 can also be halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl. In other words, R_3 and R_4 can be either a hydrogen or hydrocarbon (hereinafter "Group A"), or halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl (hereinafter "Group B"). Evonik avers that this construction is necessary because it is not chemically possible for R_3 and R_4 to be members of both Group A and Group B, and because "[t]he claim was written this way so that R_3 and R_4 could be a larger set of possibilities than R_1 and R_2[.]" (Evonik Br. at 12.) Defendants, on the other hand, contend that the plain language of the claim indicates that R_3 and R_4 must both be: (1) either a hydrogen or hydrocarbon (with the necessary refinements for hydrocarbons depicted in italics); **and also** (2) a member of a

[20] Claim 1 of the '145 Patent excludes the phrase "and are."

halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl group. (Defs.' Br. at 23-24.) Defendants agree that it is chemically impossible for R_3 and R_4 to be a member of both Group A and Group B, but allege that the law is clear that courts cannot redraft an otherwise nonsensical claim in order to make it operable and sustain its validity.

In support of their argument and proposed claim construction, Defendants rely extensively on the Federal Circuit's decision in Chef America, Inc. v. Lamb-Weston, Inc., 358 F.3d 1371 (Fed. Cir. 2004). In Chef America, the claim in dispute involved a method for baking dough and required "heating the resulting batter-coated dough to a temperature in the range of about 400° F. to 850° F." Id. at 1373. The issue was whether the language in the claim should be construed so that the dough itself had to be heated to that temperature, or whether the language only specified the temperature at which the dough was to be heated, *i.e.*, the temperature of the oven. Id. at 1373-74. Even though it was clear that the dough would be burnt to a crisp if heated to that temperature, the Federal Circuit held that it must construe claims as written — even if this would render a nonsensical result — because patentees are charged with writing patents carefully and it is not within the province of the court to rewrite claims. Id. The court specifically stated that:

> These are ordinary, simple English words whose meaning is clear and unquestionable. There is no indication that

> their use in this particular conjunction changes their meaning. They mean exactly what they say. . . . This court [] repeatedly and consistently has recognized that courts may not redraft claims, whether to make them operable or to sustain their validity. Even a nonsensical result does not require the court to redraft the claims of the [] patent. Rather, where as here, claims are susceptible to only one reasonable interpretation and that interpretation results in a nonsensical construction of the claim as a whole, the claim must be invalidated.

Id. (internal citations & quotation marks omitted).

On the other hand, in support of its own proposed claim construction, Plaintiff cites to Ecolab, Inc. v. FMC Corporation, 569 F.3d 1335 (Fed. Cir. 2009) — a case which distinguished Chef America. Ecolab dealt with patents on chemical products used by food processors to reduce pathogens — such a E.coli and salmonella — on uncooked beef and poultry. Id. at 1340. The parties disputed construction of the term "sanitize," which the patent defined as "denote[s] a bacterial population reduction to a level that is safe for human handling and consumption." Id. at 1344. It was undisputed that the meat was not necessarily safe for human consumption until it was cooked, but the definition of "sanitize" did not expressly state that an element of cooking was required in order to be considered sanitized. Id. The plaintiff relied on Chef America to argue that, even if the meat was not safe for consumption unless it was also cooked, the court could not rewrite the claims in the patent and was required to construe them as written. Id. at 1344-45. The Federal Circuit, however,

found Chef America distinguishable because the definition of "sanitize" in Ecolab was not unambiguous as the disputed term had been in Chef America. Id. at 1345. Rather, the Ecolab Court believed "sanitize" was susceptible to more than one interpretation because the claim's language did not specify whether the consumption of meat was to occur immediately after application of the patented chemical, or at a later time after the meat was cooked. Id. Accordingly, the Federal Circuit declined to accept the plaintiff's proposed construction of the disputed term based on the holding of Chef America.

Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc., 520 F.3d 1358 (Fed. Cir. 2008) also addressed application of Chef America to a factual scenario largely similar to the one at hand. The plaintiff in that case, Ortho-McNeil, patented a pharmaceutical that was used to treat epilepsy — topiramate — and claimed that Mylan's pharmaceutical infringed upon its patented technology. Id. at 1360. The claim at issue provided that: "[a] sulfamate . . . wherein . . . R2, R3, R4 and R5 are independently hydrogen or lower alkyl **and** R2 and R3 and/or R4 and R5 together may be a group of [the molecular structure for] formula II[.]" Id. at 1361 (emphasis added). Similar to the case at hand, the parties disputed interpretation of the word "and" in the claim. Mylan alleged that the contested phrase was comprised of two independent clauses and that both of these requirements had to be

met in order for a compound to infringe. In support of its proffered construction, Mylan relied on Chef America to argue that a claim must be enforced as written, even if it would produce a nonsensical result. The Federal Circuit disagreed, however, and found that the word "and" joined mutually exclusive possibilities:

> To the contrary, the claim language depicts two subsets of compounds, but does not require their simultaneous existence. In one subset of compounds covered by claim 1, the groups R2, R3, R4, and R5 are independent of one another, in which case, according to the claim, they are either hydrogen or lower alkyl. In a second subset of compounds covered by claim 1, the R2 through R5 groups are not independent, but rather R2 and R3 are together, and/or R4 and R5 are together, to form either one or two groups of formula II. Topiramate is an example of this type of compound. . . . Thus, as used in this claim, *and* conjoins mutually exclusive possibilities.

Id. at 1361-62. The circuit further found Chef America distinguishable on the grounds that the language in that case only had one possible interpretation that rendered a nonsensical result, whereas the language of the claim in Mylan was subject to an interpretation that could produce a sensible result. Id. at 1363. Indeed, the court specifically stated that: "Chef America does not require this court . . . to interpret *and* according to its most common usage in the dictionary. To the contrary, this court . . . must interpret the term to give proper meaning to the claim in light of the language and intrinsic evidence." Id. at 1365.

This Court finds that, similar to Ecolab and Mylan, the

instant case is distinguishable from Chef America. Notably, a primary basis of the Federal Circuit's holding in Chef America was that the claim terms involved "ordinary, simple English words whose meaning [was] clear and unquestionable." Chef Am., Inc., 358 F.3d at 1373. Thus, since the language in the claim was commonplace and explicitly clear, the words could only be construed to mean exactly what they stated. Id. By contrast, the language in the instant case is not ordinary or simple. To the contrary, it is chemically complex. Thus, the drafter's intent is not so readily apparent in this instance as it was to the Federal Circuit in Chef America. Indeed, the word "and" in the present context is subject to more than one possible interpretation — one of which is Evonik's proposed construction.[21] When a term is subject to different

[21] At the Markman Hearing, the Court and the parties addressed the possibility of another construction of the term "and" not proposed by either party. Per this construction, R_1, R_2, R_3, and R_4 could all be hydrogen, or could be a hydrocarbon group (with the necessary refinements) combined with R_3 and R_4 as halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl. In other words, according to this construction, Group A would be comprised of hydrogen, and Group B would be comprised of a combination of a hydrocarbon group and halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl. The Court questioned the parties as to this possible construction of "and," but reserved judgment on the issue.

Upon a further review of the patent's text and the intrinsic evidence in the record, the Court finds that the drafters of the patent did not intend such an interpretation of the disputed term. First, the use of a comma "," after the phrase "are each hydrogen or a hydrocarbon group" in the contested language in Claim 1 of the '528 Patent grammatically signals that this phrase

interpretations, and one interpretation would render a sensible approach while the other would not, courts "should attempt to construe the claims to preserve their validity[.]" Process Control Corp. v. Hydreclaim Corp., 190 F.3d 1350, 1356 (Fed. Cir. 1999)(citing Smith v. Snow, 294 U.S. 1, 14 (1935); Modine Mfg. Co. v. U.S. Intn'l Trade Comm'n, 75 F.3d 1545, 1556 (Fed. Cir. 1996))(internal parantheticals omitted). Just as in Mylan, if the Court were to accept Defendants' proposed construction and construe the word "and" in accord with its common dictionary definition, this would render the nonsensical result of a chemically impossible molecular structure. It is undisputed by the parties that one of ordinary skill in the art would recognize that it would be chemically impossible for R_3 and R_4 in the molecular structures to be members of both Group A and Group B.

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is separate and apart from the phrases that follow. On the other hand, there is no comma "," to offset hydrogen from hydrocarbon in the disputed claim. Accordingly, a plain English interpretation of this language counsels against the aforementioned claim construction. See In re Hyatt, 708 F.2d 712, 714 (Fed. Cir. 1983)("A claim must be read in accordance with the precepts of English grammar.").

Moreover, other sections of the '528 Patent do not support such a construction. More specifically, the Abstract of the '528 Patent states that: "the ligand L^2 is an uncharged electron donor . . . where R_1, R_2, R_3 and R_4 are hydrogen **or/and** hydrocarbon groups." ('528 Patent, Abtract (57)(emphasis added)). This phrase indicates that the patentee did not intend R_1, R_2, R_3, and R_4 to either all be hydrogen or a combination of a hydrocarbon group and halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl. Rather, this phrase supports a construction of the term "and" as construed and adopted by the Court in its Discussion above.

Therefore, as acknowledged by the parties at the Markman Hearing, it is presumable that the drafters of the '528 Patent would not intentionally draft a claim that would not make sense chemically. Thus, the Court finds that Chef America does not govern the instant scenario.

In light of the foregoing, the Court accepts Evonik's proposed claim construction, and construes the term "and" as follows: R_1, R_2, R_3, and R_4 in the Formulae II, III, IV and V may be identical or different to one another, and may each be a hydrogen or a hydrocarbon. Additionally, R_3 and R_4 may also be halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl. R_3 and R_4 may not, however, be both a hydrogen or hydrocarbon and also a halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl, as such a composition is chemically impossible. Stated differently, R_1, R_2, R_3, and R_4 could all be hydrogen. R_1, R_2, R_3, and R_4 could also all be hydrocarbons. Further, R_1 and R_2 could also be hydrogen and/or hydrocarbon, while R_3 and R_4 could be some combination of halogen, nitro, nitroso, alkoxy, aryloxy, amido, carboxyl, carbonyl, thio or sulfonyl, but not also hydrogens or hydrocarbons. The Court finds that such a construction is sensible, chemically possible, and in line with the overall context of the patent.

C. "Neutral Electron Donor"

The parties initially disputed construction of the term "neutral electron donor" as it is utilized in Claim 11 of the '145 Patent. More specifically, Evonik proposed that "neutral" meant that a "[molecular] group is neither positively nor negatively charged," and that "electron donor" in this context meant that "the [molecular] group tends to transfer electron density to the catalyst's ruthenium atom[.]" (Evonik Br. at 14.) Thus, Evonik's proposed construction of the term "neutral electron donor" as utilized in the '145 Patent was: "an uncharged molecular group that tends to transfer electron density to another atom or molecular group." (Id.) On their part, Defendants alleged that the transfer of electron density in the neutral electron donor must come from a lone pair of electrons. Thus, Defendants' proposed construction of neutral electron donor was: "an uncharged molecular groups that tends to transfer electron density from a lone electron pair to another separate atom or molecular group." (Defs.' Br. at 23-24.)

In its Response Memorandum to Defendants' Markman Brief, Evonik withdrew its proposed construction, and adopted Defendants' construction of the term. [Docket No. 241, Evonik Degussa GmbH's Resp. Mem. Supp. Claim Constr. of Disputed Claim Terms, at 17.] Accordingly, the Court finds that the term "neutral electron donor" as utilized in Claim 11 of the '145

Patent should be construed as: "an uncharged molecular groups that tends to transfer electron density from a lone electron pair to another separate atom or molecular group."

D. Aryl

The parties next dispute construction of the term "aryl" as it is utilized in Claims 27 and 45 of the '590 Patent. Evonik asserts that it is well known in the organic chemistry field that aryl molecules are a particular subset of hydrocarbons that are aromatic, and that hydrocarbons are chemical compounds comprised of only carbon and hydrogen. (Evonik Br. at 15.) Evonik therefore argues that, as utilized in the '590 Patent, aryl can only include atoms that are carbon and hydrogen, and thus proposes the following claim construction: "an aromatic hydrocarbon in which at least one hydrogen has been removed." (Id. at 16.) According to Evonik, "[t]he removal of a hydrogen atom is needed in the definition merely to allow a place for the aryl group to be attached to the catalyst[.]" (Id.) Defendants, on the other hand, allege that the term aryl does not merely include hydrocarbon groups, but likewise can encompass "heteroaryl" groups, *i.e.*, atoms other than carbon and hydrogen. (Defs.' Br. at 29.) Thus, Defendants propose the following construction of aryl as used in the '590 Patent: "[a]n aromatic group, which may have one or more rings, wherein the aromatic ring structure has carbon-carbon bonds, and may contain at least

one heteroatom in the ring." As indicated by Defendants, "[a]lthough the parties' proposed constructions seem much different in the words they use, the crux of the dispute is whether 'aryl' encompasses heteroaryls." (Id. at 28-29.) In other words, as succinctly stated by Evonik at the Markman Hearing, "the parties simply dispute whether 'aryl' should be broadened to include 'heteroaryls.'"

The Court first considers the intrinsic evidence. Defendants allege that other sections of the '590 Patent specification support a finding that aryl is broad enough to encompass heteroaryl groups. More specifically, in the "Detailed Description" section of the specification, the patent states that:

> In this embodiment, another ligand of metal M is Ar, which is an aromatic ring system, including the η^6-bonded system. The symbol η is used to signify that all aromatic ring atoms are bonded to the metal atom. Such systems include C_6H_6 ring systems, and various alkyl substituted C_6H_6 ring systems. Heterocyclic arenes[22] are also suitable[.]

('590 Patent, col. 5, lines 52-57.) As recognized by the parties, "Ar" is a common abbreviation for aryl. Defendants argue that the last sentence of this language shows that the patentee intended to include heteroaryls within its use of aryl throughout the patent. Evonik, on the other hand, contends that

[22] A heterocyclic arene is a type of heteroaryl.

the above-quoted language indicates that heteroaryls could also be suitable in the embodiment, but that the phrase does not support a finding that the patentee meant to indicate that aryls always include heteroaryls. According to Evonik, had the patentee intended to include heteroaryls within its use of aryl in the embodiment, there would be no need to indicate that heteroaryls could likewise be suitable.

The Court agrees with Evonik. As it indicated at the Markman Hearing, the final sentence of the above-quoted language does not explicitly provide that the term aryl as utilized in the '590 Patent always includes heteroaryls, but rather operates as more of an "aside" modifying the rest of the phrase. In other words, if the term aryl standing alone was clear enough to expressly include heteroaryls within its definition, then the patentee would not have needed to include the additional phrase indicating that heteroaryls would also be appropriate in the embodiment. Accordingly, the intrinsic evidence appears to support Evonik's construction of the term aryl.

Although intrinsic evidence is the single best authority for interpreting terms in claim construction disputes, see Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996); Phillips v. AWH Corp., 415 F.3d 1303, 1316 (Fed. Cir. 2005), to be sure, the Court also considers extrinsic evidence that is relevant to the instant dispute. The parties have introduced

three technical dictionary definitions that they believe would aid the Court in its construction of aryl. First, Evonik points to the definition of aryl in The McGraw-Hill Dictionary of Scientific and Technical Terms (6th ed. 2003):

> An organic compound derived from an aromatic hydrocarbon by removal of one hydrogen.

Evonik also cites the definition of aryl in Hawley's Condensed Chemical Dictionary (11th ed. 1987):

> A compound whose molecules have the ring structure characteristic of benzene, naphthalene, phenanthrene, anthracene, etc., *i.e.*, either the six-carbon ring or benzene or the condensed six-carbon rings of the other aromatic derivatives.

On their part, Defendants offer a definition from the International Union of Pure and Applied Chemistry ("IUPAC"), a source which neither party disputes is highly regarded in the organic chemistry field:

> Groups derived from *arenes* by removal of a hydrogen atom from a ring carbon atom. . . . Groups similarly derived from *heteroarenes* are sometimes subsumed in this definition (*see heteroaryl* groups).

(67 International Union of Pure and Applied Chemistry, Pure & Applied Chem., 1307-76 (1995)). Defendants assert that canned dictionary definitions should not be given any particular weight in claim construction disputes if they contradict evidence otherwise found in the patent and intrinsic evidence. Defendants further allege that Evonik's two proposed dictionary definitions

conflict with aryl as it is utilized in the '590 Patent, but that their own dictionary definition from the IUPAC does not do so. Plaintiff, on the other hand, argues that all three dictionary definitions support its proffered construction. More specifically, Evonik avers that the IUPAC definition does not explicitly define aryl as always including heteroaryls, but rather only indicates that heteroaryls are "sometimes" subsumed within this definition. Therefore, according to Evonik, the IUPAC definition plainly indicates that, if heteroaryls are sometimes included within the definition of aryl, then, by the same token, sometimes they are not. Accordingly, if one skilled in the art intended to include heteroaryls within his use of aryl in the field, he would need to explicitly indicate as much in his work.

The Court finds that Evonik's argument with respect to the extrinsic evidence logically comports with the Court's understanding of the intrinsic evidence. In other words, in the organic chemistry field, it is possible for one's use of the term aryl to encompass heteroaryls. However, although such a reading is possible, one of ordinary skill in the art would not automatically assume that use of the term aryl is synonymous with heteroaryl. Therefore, in order to indicate that a particular use of aryl should likewise encompass heteroaryl, one would need to signal such an intent to the reader. The instant use of the

term in Claims 27 and 45 of the '590 Patent does not indicate such an intent. To the contrary, the claims make no reference to "heteroaryl," and that term is never expressly defined in the patent. The Court cannot read a limitation into a claim term that is not expressly indicated in the patent's text. Had the drafters of the '590 Patent intended to include heteroaryls within their definition of aryl, then they should have explicitly done so. Absent such a clear definition, the Court cannot import such a limitation into the use of aryl in the '590 Patent.

Accordingly, the term "aryl" as utilized in Claims 27 and 45 of the '590 Patent shall be afforded the instant construction: "an aromatic hydrocarbon in which at least one hydrogen has been removed."

IV. CONCLUSION

For all the foregoing reasons, the Court construes the disputed claim terms in the '528, '145, and '590 Patents to give them their plain and ordinary meaning within the context of the respective patents.

An appropriate Order follows.

s/ Noel L. Hillman
At Camden, New Jersey NOEL L. HILLMAN, U.S.D.J.